each of which is afterwards crowned with four or five more, and thus, by repeated developments, an umbellately flabelliform, fastigiate frond is formed. The space between each axil (or each *internode*) invariably consists of a single cell, enlarging upwards, and annulated in its lower half. The older branches are thinly coated with calcareous matter; the younger are membranaceous.

This plant is named in honour of Dr. James Apjohn, Professor of Chemistry in the University of Dublin, and Mrs. Apjohn, the latter of whom is a zealous collector and observer of British Algæ; the former, I need not say, is worthy of any scientific commemoration that may be offered to him. The genus belongs to *Valonieæ*, and among Australian genera will stand nearest to *Struvea*, Sond.; but is much more closely related to the West Indian *Chamædoris*, Mont., from which, however, it differs sufficiently in habit and character. In aspect *Apjohnia* looks almost like a very luxuriant and robust specimen of *Cladophora pellucida*, though not very closely related to that plant.

Melbourne, January 10, 1855.

XXXI.—*Some Remarks on Vegetable Placentation.*

By John Cleland, Esq.*

The object of the few following remarks is to bring forward some evidence against the axile theory of placentation, and to show that the free central placenta found in many plants is really composed of a second whorl of carpels with everted edges.

My observations are founded entirely on the *Lychnis* and *Primula*. In the latter we have the most perfect example of a free placenta, while the former illustrates most distinctly the theory which I wish to bring forward.

On opening the fruit of the *Lychnis dioica*, its carpels are seen to be united into a perfect circle, and to present no trace of their homology with the leaf except in the venation on their internal surface. When the seeds are removed the funicular cords are seen arranged in five vertical double rows with smooth spaces between. On making a transverse section, these smooth spaces are found to be composed of a pad of white cellular tissue, and alternating with them and with the rows of cords are the five rays of a star-shaped mass of the same white cellular substance occupying the centre. This star seems clearly to indicate the formation of the placenta from five parts, and the position of the

* Read before the Botanical Society of Edinburgh, April 12, 1855.

cords in five series shows the same thing. But this is not consistent with the axile theory. If ovules are ever equivalent to buds emanating directly from the axis, they must in every such case be more or less under the law of evolution followed by the leaves, and however their arrangement may seem from circumstances to depart from that law, they cannot observe a system of distribution essentially different. We find a whorled arrangement followed by every other homologue of the leaf, and should expect it here too. But in the case before us, the ovules are given off in vertical double rows. The objection may be started, that this appearance may result from the piling of whorls one on another without alternation, just as the stamen is in front of the petal in the Barberry and the Buckthorn, or rows of petals are piled in front of one another in abnormal specimens of the Camellia. But if this explanation be adopted, we have still to account for the rows being double, and for each row being connected by vascular tissue with the one on the other side of the adjoining interspace, while to its fellow it is only joined by interstitial cellular tissue.

On the other hand, if we adopt the ordinary marginal theory, we have staring us in the face the old objection, that there is no trace of any connexion ever existing between the placenta and wall of the ovary; but on the contrary, between the double rows of cords where the carpels are supposed to have turned inwards, we have a smooth pad of cellular substance. Moreover we should expect the rays of the central star to be pointed to the interspaces instead of being in the position we find them in; for by this theory each pair of rows is formed from the margins of one carpel and has nothing to do with the neighbouring pairs, and we should therefore expect to find *a* (fig. 1) connected by vascular tissue, not with *b*, but with *c*.

What I wish to suggest as a better explanation than either of the above is, that this placenta is formed of a second whorl of carpels, distinct from and alternating with the outer carpels, and bearing the ovules on their everted margins. This view accounts for the arrangement of the vascular tissue. The double rows of cords are considered according to it as formed from the margins of two adjoining carpels, and the true fellow of each of the component rows is the one at the other side of the neighbouring interspace, and the bundles of fibres represent the midribs of the leaves. This view was first suggested and seems to be very considerably supported by the monstrosity which I have figured, in which two members of the inner whorl had assumed the foliaceous form (fig. 2). One of them was much contorted on account of its excessive development in a confined space, but the other retained its place in the whorl with its edges everted.

The structures of the Primroses seem also to support the notion of a second carpellary whorl. In their case the common marginal explanation appears to particular disadvantage, and I hope to show that in respect to them too the free central explanation is untenable. The ovules indeed are sessile, and so closely set on the placenta, that it is impossible to say from their position what is their arrangement—whether whorled round an axis or in vertical rows. But other evidence is not wanting.

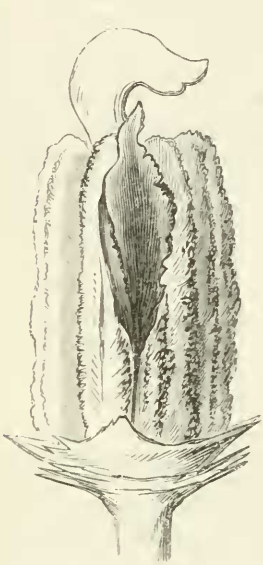

Fig. 2.

Fig. 1.

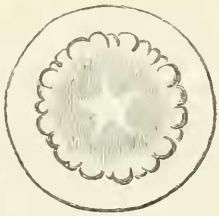

Fig. 3.

Fig. 4.

First, in a well-developed fruit of the Auricula, I have observed a five-rayed star of cellular tissue in the centre (fig. 3).

Secondly, at an early period the placenta of the Primrose is formed of two parts, one in the centre vascular and united to the torus, the other superficial, distinct, and easily removed, cellular and bearing the ovules. If the ovules were buds, the cellular tissue of their first origin could not have this superficial disposition, but would be the ascending axis of the plant, whose true position is central.

Thirdly, if the central part were a continuation of the axis, we should find some at least of the fibrous bundles from the stem running directly into it, but instead of that, the fibres are entirely re-arranged at the base of the ovary; a joint is formed at this point by decreased size of the cells of the cellular tissue,

and the first appearances of fibres in the placenta are not prolonged upward from the stem, but descend to meet those of the stem (fig. 4).

These facts seem conclusive against the axile theory in the case of the Primroses; and if in them it does not hold, we have a strong argument against its truth in any case. It seems improbable at the outset that the ovule should vary so much in morphological value as to be in one plant equivalent to a bud, and in another perhaps not far removed from it, only a secondary growth from a single leaf. This of itself prejudices one against believing that we have placentation of both the marginal and axile kind; and another circumstance likewise irrespective of arguments drawn from the structure of the pistil in particular species is in favour of the marginal theory, viz. that the pollen-grain, which is the male equivalent of the ovule, is always a mere offshoot from a leaf homologue, and we might not unnaturally expect the ovule to have the same morphological value.

XXXII.—*On the Attitudes and Figures of the Morse**.

By Dr. J. E. Gray, Ph.D., F.R.S., V.P.Z.S.

The arrival of a living Morse, or Walrus, in this country, showing that it is very different in its manner of moving from the Seals, has induced me to examine and compare the figures which have hitherto been given of this animal. Most of the oldest figures were purely imaginary. To this series must be referred the *Rosmarus* and

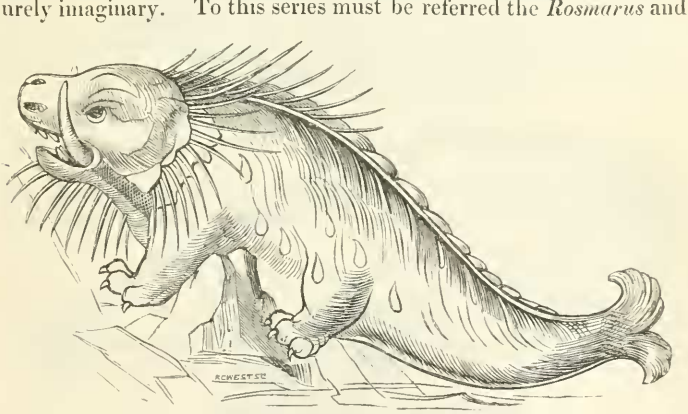

Fig. 1. *Rosmarus.* Gesner, Addenda, 368, 16. 1560.
(Reduced one-ninth.)

* From the Proceedings of the Zoological Society, No. 254, p. 112.